

REMARKS

The Applicant respectfully requests reconsideration and allowance of claims 1-8 and consideration and allowance of new claims 17-28 in view of the above amendments and the arguments set forth below.

I. THE AMENDMENTS

The present application was originally filed with claims 1-16. Claims 9-16 are canceled without prejudice in view of the restriction requirement. Claim 1 is amended and new claims 17-28 are added. Claims 1-8 and 17-28 are pending in the application in view of the above amendments.

Claim 1 is amended above at element (e) to refer to the feed chamber rather than the treatment chamber. This amendment simply corrects the misnaming error in the original claim (the claim error noted in the Office Action at page 5, lines 5-7). Claim 1 is also amended above to require a feed chute at element (f). Different feed chute structures are shown in the present application at 35 in Figure 1, 86 in Figure 3, and 104 in Figure 4. New independent claim 19 is also directed to a molten metal reactor with a feed chute extending into the area defined by the feed chamber. The feed chute required in claim 19 includes a feed material release structure. Feed material release structures comprising dump gates 38 and 39 are shown in the present application in Figure 1 for example, and an alternate feed material release structure comprising a suitable pump or auger is discussed at page 20, lines 5-10 of the present application. New independent claim 26 is directed to a molten metal reactor with a feed arrangement. One

1 example feed arrangement is discussed in the present application at page 11, lines 1-17 and
2 shown generally at reference number 24 in Figure 1.

3 The disclosure is amended at page 1 to provide the status of the parent application and at
4 page 12 to correct the misnumbering error noted in the Office Action. The Applicant appreciates
5 the Office Action comments noting this error and the misnaming error in claim 1.

6 The Applicant believes all of the claim amendments and disclosure amendments are fully
7 supported by the original disclosure, and do not add new matter to the application.
8

9 II. THE RESTRICTION REQUIREMENT

10 The Applicant affirms the provisional election to the molten metal reactor in Group I,
11 claims 1-8 for prosecution in this application. New claims 17-28 are consistent with this
12 election.
13

14 III. THE CLAIMS AS AMENDED ARE NOT ANTICIPATED BY SHULTZ

15 The Office Action rejected claims 1-2, 4, and 7 under 35 U.S.C. §102(b) as being
16 anticipated by U.S. Patent No. 5,640,702 to Shultz (the "Shultz patent" or "Shultz"). The
17 Applicant respectfully submits that the claims are not anticipated by Shultz.

18 Claims 1-8, 17, and 18

19 Claim 1 is amended above to require a feed chute having a feed material inlet into the
20 feed chamber through which feed material to be treated in the molten reactant metal enters the
21 feed chamber. The feed chute includes a portion extending into the feed chamber so as to
22 position the feed material inlet into the feed chamber within the area of the feed chamber at a

1 point spaced apart from the boundaries of the feed chamber. None of the references of record in
2 the case disclose this feed chute structure in a molten metal reactor having the feed chamber and
3 treatment chamber structure set out in the remainder of claim 1. In contrast to this structure, the
4 Shultz patent shows a molten metal reactor in which molten metal is released through a structure
5 50 at the top of the reactor chamber 38 in order to shower down on, and react with, a feed
6 material released at a lateral wall of the vessel. Not only does Shultz not disclose or suggest the
7 feed structure required by claim 1 as amended, but also it would appear to be counterproductive
8 to the system disclosed in Shultz since Shultz contemplates the molten metal reactions occurring
9 in chamber 38 (Shultz from col. 6, line 61 to col. 7, line 25).

10 Because Shultz does not disclose a molten metal reactor having the feed structure
11 required by claim 1 as amended, the Applicant submits that claim 1 is not anticipated by Shultz.
12 The Applicant also believes there is no apparent reason in the prior art to modify the Shultz
13 reactor to include all of the elements of claim 1. Thus the Applicant also submits that claim 1 as
14 amended is not obvious in view of the Shultz patent and is entitled to allowance together with its
15 dependent claims, claims 2-8, 17, and 18.

16 The Applicant notes also that the Shultz patent does not include the structure required by
17 claim 4. In particular, there is no basis in the Shultz patent for the proposition that chamber 38 is
18 bowl shaped. Considering the rectangular shape of the chamber 38 in the plan view, it appears
19 that the bottom of chamber 38 is V-shaped. There is also no indication in Shultz that the opening
20 to return channel 54 is in the center of chamber 38, but only at the bottom of the V-shape. Thus,
21 Shultz does not teach or suggest the limitation required by claim 4.
22

1 Claims 19-28

2 Applicant's new independent claim 19 includes a limitation to a feed chute similar to that
3 set out in claim 1 as amended, and that new independent claim 26 includes a limitation as to a
4 feed arrangement that releases feed material into the feed chamber at a point spaced apart from
5 the lateral walls of the feed chamber. The Shultz patent does not teach or suggest a molten metal
6 reactor having these structures. Thus the Applicant believes that claims 19 and 26 are allowable
7 over Shultz together with their respective dependent claims, claims 20-25 and 27-28.
8

9 IV. THE CLAIMS AS AMENDED ARE NOT OBVIOUS OVER THE CITED ART

10 The Office Action also rejected claims 3 and 5 under 35 U.S.C. §103(a) as being obvious
11 over Shultz in view of U.S. Patent No. 5,564,351 to Wagner (the "Wagner patent" or "Wagner");
12 claim 6 as being obvious over Shultz in view U.S. Patent No. 4,179,102 to Clumpner (the
13 "Clumpner patent" or "Clumpner"); and claim 8 as being obvious over Shultz in view of U.S.
14 Patent No. 5,353,318 to Gluntz (the "Gluntz patent" or "Gluntz"). The Applicant respectfully
15 submits that the claims as amended are not obvious in view of the cited prior art on the ground
16 that the cited combinations do not include each element required by the claims as amended.

17 As discussed above, the Shultz patent does not teach or suggest a molten metal reactor
18 having the combination of features set out in Applicant's claim 1 as amended. In particular,
19 Shultz does not teach or suggest the feed chute structure now required at element (f) of claim 1.
20 Similarly, Shultz does not disclose a molten metal reactor having a feed chute as required at
21 element (e) of claim 19 and does not disclose a molten metal reactor having a feed arrangement
22 as set out at element (e) of claim 26. None of the secondary references cited in the Office Action

1 make up for these deficiencies in Shultz as to claim 1 as amended and as to new claims 19 and
2 26. For these reasons the Applicant believes that claims 1, 19, and 26 are not obvious over the
3 cited references and are entitled to allowance together with their respective dependent claims.

4 The Office Action cited the Wagner patent in combination with Shultz against claims 3
5 and 5. In particular, Wagner was cited for showing a stirrer. The Office Action makes the
6 rejection of claims 3 and 5 on the ground that it would have been obvious to use the stirrer taught
7 by Wagner in the Shultz device. However, the stirrer shown in Wagner is simply used to
8 circulate molten metal between sides of a vessel separated by a baffle 11 (Wagner's Fig. 1) so
9 that the molten metal can be heated by a heating arrangement on one side of the baffle. There is
10 no apparent reason in either Shultz or Wagner, or elsewhere in the art of record in the case, to
11 add a stirrer to stir the material in Shultz's chamber 38 (which the Office Action defines as a feed
12 chamber). There is no heater associated in chamber 38 of Shultz and thus no reason to circulate
13 molten metal in that chamber. The flow of molten metal through chamber 38 in Shultz appears
14 to be produced by gravity as molten metal is pumped in at the top of the chamber and flows out
15 through channel 54.

16 Thus not only are claims 3 and 5 allowable through dependency from claim 1, but they
17 are also allowable in view of the limitations that they directly add.

18 The Office Action cited the Clumpner patent for its disclosure of an off-center molten
19 metal inlet into a gas fluxing vessel. First, it is noted that nothing in Clumpner makes up for the
20 deficiencies in Shultz as to independent claim 1 from which claim 6 depends. Thus the
21 Applicant believes that claim 6 is allowable over Shultz and Clumpner through dependence from
22 claim 1. Furthermore, there is no apparent reason in Shultz or Clumpner, or elsewhere in the

1 prior art to combine Shultz and Clumpner as proposed in the Office Action. In particular, Shultz
2 discloses showering the molten reactant metal through the chamber 38 in order to contact and
3 react the feed material in that chamber. How would one combine the side flow arrangement in
4 Clumpner with the molten metal showering arrangement shown in Shultz, and what purpose
5 would such a combination serve? The prior art does not suggest any way or any reason to
6 combine Clumpner and Shultz as proposed in the Office Action. For these reasons the Applicant
7 believes that claim 6 is allowable both through dependency from claim 1 and in view of the
8 limitation that it directly adds.

9 The Office Action cites Gluntz against Applicant's claim 8 in view of the disclosure in
10 Gluntz of a U-shaped trap 84 in the apparatus shown in Figure 3 of Gluntz. However, nothing in
11 the Gluntz patent makes up for the deficiencies of Shultz as to the Applicant's current
12 independent claims, claims 1, 19, and 26. Specifically, nothing in Gluntz suggests a molten
13 metal reactor with the feed chute structure required in claims 1 and 19 and the feed arrangement
14 functionality required in claim 26. The Applicant therefore submits that claim 8 is allowable at
15 least through dependency from claim 1.

16 The Applicant also believes that many of the new dependent claims recite structure not
17 shown or suggested in the cited art, and that these claims are allowable through dependency on
18 an allowable base claim and in view of the limitations that they directly add. For example, new
19 claims 17 and 22 require that the feed material inlet to the feed chamber is positioned directly
20 above the feed chamber outlet. Nothing in the cited references suggests this structure.
21 Furthermore, the cited references do not teach or suggest the sealing conduit structure required in
22 claims 18 and 24, or the vertical feed chute arrangement required in 23 and 27, or the transverse

1 feed chute arrangement required in claims 25 and 28. The Applicant therefore believes that
2 claims 18, 23, 24, 25, 27, and 28 are all allowable through dependence on their respective base
3 claim and in view of the limitations that they directly add.
4

5 V. CONCLUSION

6 For all of the above reasons, the Applicant respectfully requests reconsideration and
7 allowance of claims 1-8 and consideration and allowance of new claims 17-28. If the Examiner
8 should feel that any issue remains as to the allowability of these claims, or that a conference
9 might expedite allowance of the claims, the Examiner is asked to telephone the Applicant's
10 attorney, at the number listed below.

11 Respectfully submitted,
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13 The Culbertson Group, P.C.
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